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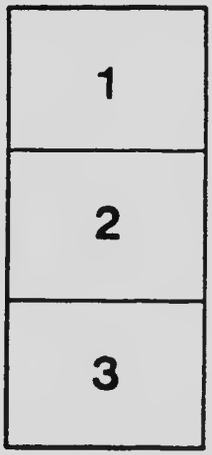

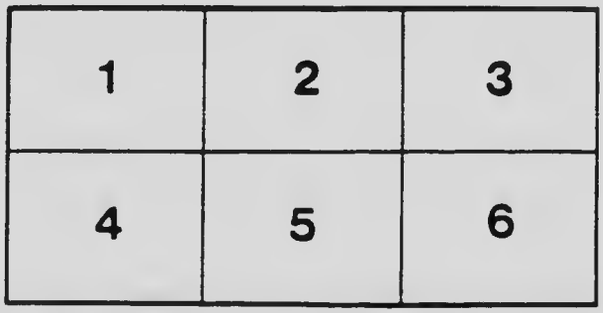

LABORATORY

OF THE

INLAND REVENUE DEPARTMENT

OTTAWA, CANADA

BULLETIN No. 211

OIL OF TURPENTINE

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LABORATORY

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INLAND REVENUE DEPARTMENT

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BULLETIN No. 211

OIL OF TURPENTINE.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

OTTAWA, July 14, 1910.

SIR:—*Oil of Turpentine* (Terebinthinæ Oleum) commonly called turpentine, is a drug recognized by the British and other Pharmacopoeias, and therefore comes within the scope of the Adulteration Act. It is a question whether the article, as employed in the arts, should be required to meet pharmacopoeal specifications; but until this point is settled, we must hold that "turpentine" means the turpentine of the pharmacopoeias.

The British Pharmacopoeia (Edn. 1898) thus describes the drug, "Limpid, colourless, with a strong peculiar odour which varies in the different kinds of oil, and a pungent and somewhat bitter taste. It is soluble in its own weight of glacial acetic acid. It commences to boil at about 320°F. (160°C.) and almost entirely distils below 356°F. (180° [illegible] or no residue remaining".

Squire's Com[illegible]. 1908) comments as follows;—"Rectified Oil of Turpentine has a sp. [illegible] to 0.880; the B.P. does not give a sp. gr.; the U.S.P. states 0.860 to 0.8[illegible] 25°C. (77°F.); the P.G. 0.860 to 0.870. It boils at about 156°C. (312.8°F.), which is the figure given in the B.P. The P.G. states that it distils completely between 155° and 162°C. (311° and 323.6 F.). The B.P. states that it should distil almost entirely below 180°C. (356°F.). *This temperature is considered (C. D. '98, ii. 55) to be too high, boiling at about 155° C. (311° F.) and at least 80 p. c. distilling below 165° C. (329° F.) would have been better.*—The U.S.P. requires that the larger part of the oil should pass over between 155° and 162° C. (311° and 323.6° F.). The optical rotation of the oil may be either dextrogyrate or laevogyrate. French Oil of Turpentine is strongly laevorotatory (−20° to −40° in a tube of 100mm. length). American Oil of Turpentine is dextrogyrate, the rotation usually varying from +9° to +14°. A 52 lb. quantity when fractionally distilled (C.D. '00, ii,174) yielded up to 162.5 C. (324.5° F.) a distillate (91.2 p. c. of the whole) which was entirely dextrogyrate and from 162.5° to 190°C. (324.5° to 374° F.) fractions (amounting to 8.52 p. c.) which increased in laevorotation with the boiling point, namely from −0.8° to −10.3°. Neither the B.P. the U.S.P. nor the P.G. refers to the optical rotation. It is officially stated

to be soluble in its own volume of Glacial Acetic Acid. This test has been shown (P.J. '02, i.503) by the author and C. M. Caines to be practically *of no value* as a test for Oil of Turpentine, although useful as a test of the strength of Glacial Acetic Acid. An acid conforming strictly to the B.P. titration test (which requires a definite figure) cannot be expected to form a clear solution with all samples of Oil of Turpentine when mixed in equal volumes. Commercial samples of Glacial Acetic Acid which require more than the B.P. figure will mix readily without subsequent separation, and most of the commercial acids give a higher figure than the B.P. With such samples of Oil of Turpentine as had up to that time been examined the mixture of any of them in equal volumes with Glacial Acetic Acid, temperature 14.4° to 16.7° C. (58° to 62° F.) became a delicate test for a strength of 99.5 p. c. acid or stronger. The test is also referred to under Acidum Aceticum Glaciale.

The more generally occurring impurities are Petroleum, Paraffin Oils, Rosin, Rosin Oil, Petroleum Benzin, Kerosene Oil or similar hydrocarbons. Petroleum, Paraffin Oils of Rosin, if present, may be detected by the residue test. Kerosene or Rosin Oil, if present, by the evaporation test. Petroleum Benzin, Kerosene and similar hydrocarbons by the Sulphuric Acid test, each of which tests is described in small type below. Some work done in the laboratory of the Canadian Inland Revenue Department (C.D. '02, i.955) has resulted in the following definition of Oil of Turpentine, which must, however, be regarded as provisional, and subject to correction and amplification ; it should be colourless, in thin layers, clear, but made decidedly opaque by shaking with 1.0 p. c. of water, and giving an opaque distillate of one-tenth volume which settles clear in a few hours. The peculiar and characteristic odour quite distinct from that of Gasolene, Rosin Oil, or Acetone. It has a sp. gr. between 0.860 and 0.880 (usually about 0.870). Samples which have been long exposed to the air have a higher density. The first 10 p. c. fraction has a sp. gr. of between 0.856 and 0.870 (usually about 0.860) ; the residual tenth should not exceed 0.900. The boiling point should lie between 154° and 158° C. (309.2° and 316.4° F.) ; nine-tenths should distil below 180° C. (356° F.). Fixed residue should not exceed 2 p. c., flash point about 32° C. (89.6° F.). The optical activity of the first fraction should increase in a plus direction by oxidation. The refractive index at 20° C. should lie between 1.4667 and 1.4722, that of the first fraction should not exceed 1.470. Moistened Starch Iodide paper should become blue when suspended over Turpentine exposed to the air, free Bromine in solution should be decolorised. Strong Sulphuric Acid should polymerize and char the sample at a boiling temperature, a rise of temperature should result on mixing with Sulphuric Acid."

The above may be taken as summing up all that is known of commercial turpentine, and it is amply evident that definitions and limits of variability are much needed. Reference is made to work done in this laboratory in 1901 (Bulletin 79). This consisted in an examination of 50 samples of commercial turpentine, having regard to the following properties :—

Physical characters—1. Colour.
2. Clearness.
3. Odor.
4. Taste.
5. Density.
6. Boiling point.
7. Volatility.
8. Vapor density.
9. Flash point.
10. Viscosity.
11. Solubility.
12. Solvent power.
13. Rotatory power for polarized light.
14. Refraction.
15. Fluorescence.
16. Oxidisability.

Chemical characters—17. Bromine absorption.
18. Rise of temperature with sulphuric acid.

The results of the examination referred to were summed up as follows, and having regard to a definition of Oil of Turpentine :—"Oil of Turpentine is a liquid, *colourless*—in thin layers, and having a yellow-red tint, equivalent to about 1 unit of yellow and 0.1 unit of red (Lovibond scale) when viewed in a column 2 dm. long. *Clear*—but made decidedly opaque by shaking with 0.1 per cent, water, and giving an *opaque*—distillate of one-tenth volume, which settles clear in a few hours. *Odour*—peculiar and characteristic, quite distinct from that of gasoline, rosin oil or acetone, and capable of disguising these odours to the extent of 10 per cent, admixture. *Density*—between 0.860 and 0.880, (usually about 0.870) but samples which have been long exposed to air may have a higher density. The *first fraction*—of one-tenth volume, has a density between 0.856 and 0.870 (usually about 0.860). The *residual tenth*—should not exceed 0.900. The *boiling point*—should lie between 154° and 158° C., and nine-tenths should distil below 180° C. The *fixed residue*—on evaporating over boiling water in a 4 inch, hemispherical dish, should not exceed 2 per cent. The viscosity, at 20° C., should be nearly 1.230 (water 1.000) McGill viscosimeter. *Flash point*—should be about 32° C. (Abel instrument). Should *dissolve*—completely in an equal volume of glacial acetic acid, and the first fraction should similarly dissolve. A *saturated solution*—of asphaltum should not be rendered translucent by dilution to ten volumes. (This test is best made by comparison with a sample of known purity.) The *optical activity*—of the first fraction should increase in a + direction by oxidation. The *refractive index*—at 20° C. should lie between 1.4667 and 1.4722. That of the first fraction should not exceed 1.4700. Moistened iodide of starch paper should become blue when suspended over turpentine exposed to air. *Free Bromine*—in solution (see section 17) should be decolorized. *Strong sulphuric acid*—should polymerize and char the sample at a boiling temperature. A *rise of temperature*—(see sec. 18), should result on mixing with sulphuric acid.

Experience since 1901 has shown that our knowledge of the article Commercial Turpentine is yet too indefinite and uncertain to be satisfactory. This is in part due to the nature and origin of the substance as known to commerce in the past. Turpentine is not a definite chemical substance, having a constant composition. It is the more volatile portions of the oleoresins derived from a number of different varieties of *Pinus*. Of later years, owing to the growing scarcity of pine forests, advantage has been taken of the fact that, by treatment in the dry way, or with superheated steam, a volatile product resembling turpentine is obtainable from pine, (roots, chips and other waste material). This article, commercially distinguished as wood-turpentine, (the original substance being called gum turpentine) resembles turpentine, and is even identical with turpentine in so many respects, that it has been found easy to market it under the same name.

But wood-turpentine, although having much in common with true turpentine is not really identical with it. This fact appears to be well known to, and recognized by the trade; and some of the chemical differences between the two are pointed out in a paper by me, contributed to the Society of Chemical Industry. (See Jour. Soc. Chem. Indust., Vol. XXVI (1907) p. 847).

An important paper on turpentine was read before the Society of Public Analysts (London, England) by J. H. Coste, F.I.C. in 1908, and is published in the Analyst, Vol. XXXIII, p. 219. Speaking of turpentine Mr. Coste says :—"There is no doubt that much of the turpentine shipped to Europe from the United States is of a very different character from that which a few years ago was recognized as typical American Turpentine."

Another sophistication of turpentine consists in the addition to it of certain petroleum fractions, which are doubtless sold to greater profit in this than in any other way. The literature of this subject is very voluminous, and scattered. It is, moreover, very contradictory; many writers claiming that, as a solvent for use in paints and varnishes, the various substitutes for turpentine are little, if at all, inferior to the genuine article. It remains, however, that the name turpentine is supposed to stand for a certain and definite product; and it should be possible so to describe that product as to be able with certainty to distinguish between turpentine and its substitutes or imitations.

The report now submitted contains results obtained in the analysis of 75 samples of turpentine purchased in the markets of the Dominion, and of ten (10) samples, furnished by importers and others. These last are indicated by letters. Table I (parts 1 and 2) gives the source of the samples, and the results of analysis. Table II makes a selection of 29 samples which are apparently genuine gum turpentine as judged by the whole results of analysis.

In connection with the results here shown it is important to note as follows :—

1. The percentage weight of Iodine taken up, approximates 370 ; which number was regarded as typical by Worstall (Jour. Soc. Chem. Indust., 1904, 302), and corroborated by myself (J.S.C.I. XXVI) the Hübl solution being employed.
2. The undissolved (unpolymerized) residue, on treatment of 10 cc with 40 cc., of a sulphuric acid containing 20 per cent of the fuming acid, seldom exceeds 10 per cent of the sample.
3. The refractive index of this residue lies between 1.4950 and 1.5000 ; read at 20° C.
4. The refractive index of the sample is about 1.4700 at 20° C.
5. The specific gravity (15.5°C.) is about 0.870.
6. The initial boiling point is not lower than 150°C. under ordinary pressure ; and the greater part (at least 75 per cent volume) distils below 160°C.
7. The middle fraction of 50 per cent volume, distils between 156° and 159°C., in most samples.
8. Ninety per cent by volume distils below 165° C., in most samples.
9. The refractive index of the second fraction of 25 per cent volume, is between 1.4685 and 1.4700 ; and that of the third fraction of 25 per cent is practically 1.4700.
10. The flash point lies between 31°C. and 34°C.

Table III contains the results of examination of nine (9) samples, furnished by various interested parties, and suspected, for one reason or another, to be surrogate. It is unfortunate that very small quantities were supplied in most cases, hence the record is less complete than could be wished. So far as it goes, it may be noted, in contrast to the general conclusions reached for genuine turpentine, that, (1) the Iodine number is decidedly below 370 ; (2) the unpolymerized residue in the first 7 samples falls within the limit for turpentine, while in I & K, the residue exceeds 40 per cent. (3) The refractive index for the first 7 samples, falls within the limits for turpentine, while samples I & K, show a much lower refraction. (4) The same holds true of the refraction of the sample itself. (5) The specific gravity of the first 5 samples is indistinguishable from that of turpentine ; for samples F & G it is quite too high ; and for K it is abnormally low. (6) Initial boiling point and temperature for distillation of 75 per cent indicate a variation from true turpentine especially notable in samples I & K. (7) The limits of temperature for distillation of middle fraction of 50 p. c., are pronouncedly different from those for genuine turpentine. (8) Limit temperature for 90 per cent distillate is too high. (9) The flash point does not serve to distinguish from genuine turpentine.

This study, interpreted in the light of our knowledge of wood-turpentine and of petroleum, justifies the conclusions that the first seven samples in this table (A to G) are essentially wood turpentines ; while samples I & K, are mixtures containing considerable amounts of petroleums.

This report shows that a considerable amount of adulterated turpentine is found on the market in Canada. The adulteration chiefly consists in additions of petroleum fractions ; but, in some instances it is due to substitution by, or addition of wood turpentine.

Wood turpentine is apparently more closely related to turpentine than are petroleums. It is claimed that certain substitutes for turpentine have equal value with the genuine article, for use in the arts. With this aspect of the question, we have nothing to do. It is the duty of this Department to require that nothing else than true turpen-

time shall be offered for sale, or sold, under that name The sale of wood turpentine or of petroleum mixtures for paint and varnish manufacture, and for other uses in the arts, may possibly be desirable; but such articles should not be sold under the name turpentine.

I believe that the information herein given will be helpful in enabling a clear and workable definition of turpentine to be made; and I beg to recommend its publication as Bulletin No. 211.

I have the honour to be, sir,
Your obedient servant,

A. McGILL,
Chief Analyst.

TABLE I, (PART I) BULL. 211—TURPENTINE.

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost. Quantity.	Cost. Cents.	Name and Address of Manufacturer or Furnisher as given by the Vendor.	Inspector's Report. (Is not an expression of opinion.)	No. of Sample.
DISTRICT OF NOVA SCOTIA—R. J. WAUGH, INSPECTOR.								
1910.								
Mar. ..	Turpentine	41941	Wm. Robertson & Son, Halifax, N.S.	3 pts.	50	Carolina Pine Product Co., Cleveland, Ohio.		41941
" ..	"	41942	A. M. Bell & Co., Halifax, N.S.	3 "	37	Unknown	Sold as American Turpentine	41942
" ..	"	41943	Crowell Bros., Halifax, N.S.	3 "	35	W. B. Dicks, London, Eng.		41943
" ..	"	41944	Martin & Moore, Halifax, N.S.	3 "	36	Imperial Oil Co., Halifax	Georgia Pure Turpentine	41944
" ..	"	41945	A. L. Melvin & Co., Halifax, N.S.	3 "	35	Carolina Pine Product Co., Halifax, N.S.		41945
DISTRICT OE PRINCE EDWARD ISLAND—THEO. MOORE, INSPECTOR.								
Mar. 7	Turpentine	38626	Stanley Shaw & Reardon, Charlottetown.	3 pts.	37	A. Ramsay & Co., Montreal		38626
" 9	"	38627	R. Tuplin & Co., Kensington	3 "	38	Carolina Pine Product Co., Cleveland, Ohio		38627
" 10	"	38628	R. T. Holman Ltd., Summerside	3 "	40	" "		38628
" 12	"	38629	S. W. Crable, Charlottetown	3 "	40	A. Jameison & Co., Montreal		38629
" 15	"	38630	Sterns Bros. Souris	3 "	40	Rogers Hardware Co., Charlottetown		38630

DISTRICT OF NEW BRUNSWICK—J. C. FERGUSON, INSPECTOR.

Mar.	3	Turpentine	39640	Robertson Foster & Smith, Ltd., St. John, N.B.	3 pts.	45	Standard Oil Co., N.Y., De B. Carrithe Agent, St. John.		39640
"	7	"	39641	W. H. Thorne & Co., Ltd., St. John, N.B.	3 "	45	De B. Carrithe, St. John, N.B.		39641
"	9	"	39642	T. McAvity & Sons Ltd., St. John, N.B.	3 "	60	North Carolina Pine Varnish Co., U.S.A.		39642
"	15	"	39643	Tweedale & Co., Fredericton, N.B.	3 "	45	Imperial Oil Co., St. John, N.B.		39643
Apr.	6	"	39644	Sumner Co., Moncton, N.B.	3 "	30	Carolina Pine Product Co., Montreal.		39644

DISTRICT OF QUEBEC—E. BELAND, INSPECTOR.

Mar.	8	Turpentine	36523	T. M. Tardivel, 34 Rue Desjardine, Quebec.	3 pts.	45	The Georgia Turpentine Co., Montreal.		36523
"	8	"	36524	B. Leonard, 53 Rue St. Jean, Quebec.	3 "	36	Unknown.		36524
"	8	"	36525	Marier & Tramblay, 71 Rue du Pont, Quebec.	3 "	39	Carolina Ripe Production.		36525
"	8	"	36526	Simard & Frére, 270 Rue St. Joseph, Quebec.	3 "	42	Unknown.		36526
"	8	"	36527	La Comp. Ganthier, 297 Rue St. Joseph, Quebec.	3 "	45	Imperial Oil Co., Quebec.		36527

DISTRICT OF ST. HYACINTHE—J. C. ROULEAU, INSPECTOR.

Mar.	3	Turpentine	1256	J. Senesac, Stanbridge Station	1½ pt.	20	Unknown		1256
"	3	"	1257	Hill & Depatie, St. Armand	3 pts.	45	Sherwin Williams, Montreal.		1257
"	7	"	1258	G. E. N. Pepin, Drummondville	3 "	40	Imperial Oil Co., Montreal		1258
"	7	"	1259	A. Davelny & fils, Davelnyville.	1½ pt.	25	Frothering & Workman.		1259
"	18	"	1260	S. Bourgéois & Cie, St. Hyacinthe.	3 pts.	33	Carolina Pine Products Co., Savannah, Ga.		1260

TABLE I, (PART I) BULL. 211—TURPENTINE—*Continued.*

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost. Quantity.	Cost. Cents.	Name and Address of Manufacturer or Furnisher as given by the Vendor.	Inspector's Report. (Is not an expression of opinion).	No. of Sample.
DISTRICT OF MONTREAL—J. J. COSTIGAN, INSPECTOR.								
1910.								
Mar. 9	Turpentine	40442	B. Beaulien, St. Jerome, P.Q.	3 pts.	45	Imperial Oil Co., Montreal		40442
" 9	"	40443	C. E. Laflamme, St. Jerome, P.Q.	3 "	45			40443
" 14	"	40444	Wall Bros., 67 Bleury St., Montreal.	3 "	40	Canada Paint Co., Ltd., Montreal.		40444
" 14	"	40445	E. D. Colleratte & Co., 95 Bleury St., Montreal.	3 "	45			40445
" 14	"	40446	Beauvais et frere, 336 St. Lawrence B., Montreal.	3 "	40			40446
DISTRICT OF OTTAWA—J. A. RICKEY, INSPECTOR.								
Mar. 15	Turpentine	42942	George Higman Son & Co., Ottawa.	3 bots.	45	Ottawa Paint Works, Ottawa	Labelled Pure Spirits of Turpentine.	42942
" 15	"	42943	William Howe, Rideau St., Ottawa.	3 "	25	Southern States Turpentine Co., Cleveland, Ohio.		42943
" 15	"	42944	J. B. Duford, Ottawa	3 "	38	W. G. Charleson, Ottawa		42944
" 15	"	42945	The Ottawa Paint Works, Ottawa	3 "	38	Am. Naval Stores Co., New York.	Labelled Pure Spirits of Turpentine.	42945
" 15	"	42946	John Storr, Ottawa	3 "	38	Southern States Turpentine Co., Cleveland, Ohio.		42946

DISTRICT OF KINGSTON—JAS. HOGAN, INSPECTOR.

Mar.	1	Turpentine	44201	J. Nugent, Kingston	3 pts.	50	Queen City Oil Co., Kingston				44201
"	1	"	44202	J. B. Bunt, Kingston	3 "	45	A. Chown, Kingston				44202
"	1	"	44203	W. Mitchell, Kingston	3 "	50	North Carolina Production Co., Montreal.				44203
"	1	"	44205	A. Chown & Co., Kingston	3 "	35	New York Agent, Direct from Havanna.				44205
"	1	"	44256	A. B. Dalton & Sons, Kingston	3 "	40	Am. Navy Stores New York				44256

DISTRICT OF TORONTO—H. J. DAGER, INSPECTOR.

"	2	Turpentine	41399	Geo. Pearsall & Son, 417 Yonge St., Toronto.	3 pts.	45	The Queen City Oil Co., Ltd., Toronto.				41399
"	2	"	41400	W. C. McFarland, 391-393 Parliament St., Toronto.	3 "	50	J. H. Morrin & Co., Toronto				41400
"	4	"	41497	J. M. B. Stephens, New Market	3 "	60	Brandram & Henderson, Montreal				41497
"	7	"	41498	Thomas Ramsay, Market Square, Hamilton.	3 "	37	Carolina Pine Products Co., Cleveland, Ohio.				41498
"	8	"	41499	Alexander Hardware Co., Ltd., King St. E., Hamilton.	3 "	40	A. Ramsay & Son, Montreal				41499

DISTRICT OF LONDON—T. KIDD, INSPECTOR.

Mar.	15	Turpentine	44731	— Howell, Goderich	1 pt.	20	Canada Paint Co.				44731
"	18	"	44733	Matt. Williams, Seaforth	3 bots.	30	Gorman & Eckert, London				44733
Apr.	11	"	44736	W. Barley, Mitchell	3 "	30	Unknown				44736
"	14	"	44745	Will. Bartlett, St. Mary's	1½ pt.	15	Sanders & Percy, Toronto				44745
"	19	"	44748	J. Minnes, Hardware Merchant, Fergus.	1 pt.	20	" "				44748

TABLE 1, (PART I) BULL. 211—TURPENTINE—*Continued.*

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost. Quantity.	Cost. Cents.	Name and Address of Manufacturer or Furnisher, as given by the Vendor.	Inspector's Report. (In not an expression of opinion.)	No. of Sample.
DISTRICT OF WINDSOR—JNO. TALBOT, INSPECTOR.								
1910.								
Mar. 2	Turpentine	42501	Kilpatrick Bros., London, Ont	3 pts.	30	Hobb's Hardware Co., London, Ont		12501
" 2	"	42502	Robert Parson, London, Ont	3 "	30	D. H. Howden Co., London, Ont		42502
" 2	"	42503	McLean Hardware Co., London, Ont.	3 "	30	D. H. Howden Co., London, Ont		42503
" 2	"	42504	Purdow Hardware Co., London, Ont.	3 "	30	Am. Naval Stores, Detroit		42504
" 2	"	42505	W. B. Gillespie, London, Ont	3 "	20	D. H. Howden & Co., London		42505
DISTRICT OF MANITOBA—A. C. LARIVIERE, INSPECTOR.								
Mar. 15	Turpentine	39871	Linklater Bros. & Elder, Winnipeg.	" pts.	50	G. F. Stephens & Co., Winnipeg		39871
" 15	"	39872	C. Tadman, Winnipeg	3 "	50	" "		39872
" 15	"	39873	The Bee Hive, Winnipeg	3 "	45	" "		39873
" 15	"	39874	The Lennox Hardware Co., Winnipeg.	3 "	50	Unknown		39874
" 15	"	39875	Wm. Johnson, Winnipeg.	3 "	45	"		39875
DISTRICT OF CALGARY—R. W. FLETCHER, INSPECTOR.								
Mar. 15	Turpentine	35637	J. J. Hewit, Medicine Hat	3 pts.	60	Canada Paint Co., Montreal		35637
" 17	"	35638	Linton & Hall, Calgary	3 "	60	Imperial Oil Co., Calgary		35637
" 17	"	35639	Corner Hardware Co., Ltd., Calgary.	3 "	60	Marshall Wells Co., Winnipeg		35639

"	17	"		35640	The J. H. Ashdown Hardware Co., Ltd., Calgary.	3 "	60	Imperial Oil Co., Calgary				35640
"	18	"		35641	T. R. Stuart & Co., Calgary	3 "	60	G. F. Stephens Co., Calgary				35641

DISTRICT OF VANCOUVER—J. F. POWER, INSPECTOR.

Mar.	15	Turpentine		37853	J. A. Flett, Vancouver	3 pts.	40	Imperial Oil Co., Victoria, B.C				37853
"	15	"		37854	Wood, Vallance & Leggett, Vancouver.	3 "	40	" "				37854
"	15	"		37855	Fraser Hardware Co., Vancouver	3 "	55	" "				37855
"	15	"		37856	Abercrombie Hardware Co., Vancouver.	3 "	50	" "				37856
"	15	"		37857	Bonnell Hardware Co., Vancouver	3 "	55	" "				37857

DISTRICT OF VICTORIA—D. O'SULLIVAN, INSPECTOR.

Mar.	21	Turpentine		41674	The Staneland Co., Victoria, B.C.	3 pts.	50	Imperial Oil Co				41674
	21	"		41675	Mellor Bros., Ltd., Victoria, B.C.	3 "	60	"				41675
"	21	"		41676	Melrose Paint Co., Victoria, B.C	3 "	40	"				41676
"	21	"		41677	J. L. Forrister, Victoria, B.C.	3 "	45	British Am. Paint Co., Victoria, B.C				41677
"	21	"		41678	British Am. Paint Co., Victoria, B.C.	3 "	40	Imperial Oil Co Vancouver, B.C.				41678
		"		A								A
		"		B	Canada Turpentine Co., per E. Fielding.			Steam process, Wood Turpentine				B
		"		C	Canada Turpentine Co., per R. Munroe.			" "				C
		"		D	Cadillac Turpentine Co., per E. Fielding.			No. 1 Grade Steam Process Wood Turpentine.				D
		"		E	E. Fielding			Wood Turpentine from Georgia				E
		"		F	"			" "				F
		"		G	"			" "				G
		"		H								H
		"		I								I
		"		K	Sumner Co., Moncton, N.B., L. 7045							K

TABLE I, (PART II) BULL.

RESULTS OF

Name of Inspectoral District.	Number of Sample.	Hubl Iodine Number.	Insol. Residue from 10 cc. with 40 cc. H_2SO_4 Conc. 1 fum.	Ref. Index 20° of Insoluble Residue.	Ref. Index 20° of Turpentine.	Sp. Gr. 15·5 of Turpentine.	Distillation Tem. 1st 25 cc. from 100 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Ref. Index Fraction 1st 25 cc. Distillate.
							° °	° °	° °	° °	
Nova Scotia.....	41941	290·4	3·0	1·4667	1·4668	·8594	150 – 160	160 – 165	165 – 174	175 – 197	1·4626
	41942	293·4	2·1	1·4687	1·4678	·8634	154 – 160	160 – 164	164 – 173	173 – 202	1·4644
	41943	303·1	·8	1·4898	1·4720	·8637	159 – 162	162 – 164	164 – 167	167 – 172	1·4695
	41944	377·5	·65	1·4967	1·4719	·8746	153 – 157	157 – 158	158 – 159	....	1·4692
	41945	251·5	3·5	1·4643	1·4660	·8576	154 – 160	160 – 166	166 – 174	174 – 215	1·4621
Prince Edward Island	38626	372·3	·75	1·4994	1·4703	·8710	150 – 156	156 – 157	157 – 158	158 – 163	1·4680
	38627	223·0	3·85	1·4596	1·4646	·8574	148 – 158	158 – 166	166 – 180	180 – 227	1·4564
	38628	351·2	1·5	1·4849	1·4692	·8652	154 – 157	157 – 158	158 – 159	159 – 165	1·4680
	38629	386·9	1·05	1·4996	1·4708	·8684	152 – 156	156 – 157	157 – 158	158 – 161	1·4687
	38630	369·2	·7	1·4991	1·4717	·8759	154 – 157	157 – 158	158 – 161	161 – 171	1·4690
New Brunswick.....	39640	335·5	1·35	1·4865	1·4686	·8670	145 – 156	156 – 157	158 – 159	159 – 164	1·4628
	39641	368·9	·9	1·5006	1·4710	·8718	154 – 157	157 – 157	157 – 159	159 – 163	1·4690
	39642	363·5	1·3	1·4874	1·4686	·8663	149 – 155	155 – 157	157 – 159	159 – 163	1·4624
	39643	363·4	1·05	1·4820	1·4688	·8657	145 – 156	156 – 158	158 – 159	.....	1·4619
	39644	200·7	3·6	1·4678	1·4658	·8589	152 – 159	160 – 164	164 – 177	177 – 210	1·4624
Quebec	36523	330·2	·95	1·4965	1·4714	·8747	152 – 156	156 – 158	158 – 160	160 – 169	1·4678
	36524	289·6	4·00	1·4483	1·4559	·8366	110 – 148	148 – 154	154 – 158	158 – 262	1·4322
	36525	295·8	2·65	1·4694	1·4657	·8589	152 – 158	158 – 161	161 – 166	166 – 178	1·4628
	36526	365·8	1·05	1·5000	1·4706	·8692	153 – 157	157 – 158	158 – 168	158 – 158	1·4686
	36527	290·8	3·05	1·4524	1·4553	·8339	120 – 144	144 – 152	152 – 157	157 – 161	1·4356
St. Hyacinthe.	1256	256·2	3·9	1·4652	1·4628	·8607	153 – 160	160 – 163	163 – 172	172 – 193	1·4582
	1257	365·0	·75	1·4980	1·4714	·8730	154 – 158	159 – 158	158 – 160	160 – 166	1·4689
	1258	350·3	·85	1·4952	1·4731	·8870	150 – 157	157 – 159	159 – 165	165 – 210	1·4679
	1259	246·5	3·9	1·4673	1·4655	·8579	154 – 162	162 – 167	167 – 181	181 – 227	1·4617
	1260	241·2	2·9	1·4481	1·4654	·8576	151 – 161	161 – 168	168 – 177	177 – 215	1·4587
Montreal	40442	344·1	·65	1·4936	1·4730	·8674	152 – 157	157 – 160	160 – 164	165 – 205	1·4678
	40443	373·8	·85	1·4997	1·4718	·8735	152 – 156	156 – 156	156 – 160	160 – 167	1·4681
	40444	355·4	·6	1·4826	1·4700	·8683	150 – 155	155 – 156	156 – 158	158 – 162	1·4672
	*40445	369·1	1·0	1·4993	1·4702	·8707	150 – 156	156 – 158	158 – 159	....	1·4667
	40446	368·9	1·3	1·4887	1·4687	·8660	152 – 156	156 – 157	157 – 159	159 – 162	1·4667
Ottawa...	42942	366·6	1·0	1·5012	1·4703	·8691	149 – 156	156 – 156	156 – 158	158 – 159	1·4697
	42943	306·0	2·5	1·4695	1·4660	·8668	150 – 156	156 – 158	158 – 160	160 – 175	1·4633
	42944	276·0	2·5	1·4688	1·4661	·8615	152 – 156	156 – 159	159 – 165	165 – 175	1·4634
	42945	376·8	1·1	1·5040	1·4716	·8681	155 – 157	157 – 159	159 – 160	160 – 161	1·4702
	42946	295·7	2·8	1·4696	1·4657	·8595	152 – 157	158 – 160	160 – 164	164 – 174	1·4628
Kingston	44201	360·4	1·3	1·4894	1·4704	·8706	155 – 157	157 – 158	158 – 160	160 – 168	1·4682
	44202	337·3	1·0	1·4956	1·4714	·8754	152 – 157	157 – 158	158 – 159	160 – 168	1·4693
	44203	250·8	3·8	1·4653	1·4658	·8576	150 – 160	160 – 165	165 – 179	179 – 227	1·4612
	44205	373·2	·8	1·4984	1·4714	·8748	150 – 157	157 – 158	158 – 160	160 – 168	1·4686
	44256	369·5	1·0	1·5000	1·4710	·8566	155 – 157	158 – 158	158 – 159	159 – 161	1·4698
Toronto..	41399	382·2	1·0	1·4977	1·4701	·8679	153 – 156	156 – 156	156 – 157	157 – 162	1·4679
	41400	365·3	1·1	1·4914	1·4697	·8669	152 – 157	157 – 158	158 – 159	159 – 162	1·4664
	41497	351·6	·95	1·4977	1·4715	·8720	155 – 157	157 – 158	158 – 159	159 – 163	1·4702
	41498	237·3	3·8	1·4601	1·4643	·8582	145 – 159	159 – 166	166 – 176	176 – 220	1·4560
	41499	395·0	·95	1·5000	1·4703	·8688	153 – 155	155 – 155	155 – 158	.....	1·4687
London.....	44731	358·1	·95	1·5008	1·4714	·8705	151 – 156	156 – 158	158 – 159	159 – 163	1·4690
	*44733	358·0	·9	1·4987	1·4696	·8692	....	....	....	....	..
	44736	363·9	·75	1·5014	1·4718	·8819	153 – 156	156 – 157	157 – 160	160 – 176	1·4686
	44745	375·1	·6	1·4952	1·4716	·8681	153 – 156	156 – 157	157 – 157	157 – 162	1·4678
	†44748	.....	...	.....	.....	.....	.....	.....	.....	.....	.....
Windsor	42501	360·1	·8	1·4923	1·4702	·8698	152 – 157	157 – 157	157 – 158	158 – 163	1·4686
	42502	393·7	·65	1·4994	1·4706	·8699	153 – 155	155 – 156	156 – 157	157 – 162	1·4686
	42503	392·6	·7	1·4997	1·4700	·8679	153 – 156	156 – 157	157 – 157	157 – 159	1·4687
	42504	380·5	·65	1·4993	1·4705	·8702	152 – 155	155 – 156	156 – 158	158 – 162	1·4687
	42505	375·6	·6	1·4974	1·4700	·8678	150 – 156	156 – 156	156 – 157	.....	1·4688

* Small sample. † Sample in dirty bottle and therefore not worked.

211—TURPENTINE.

Analysis.

Fraction 2nd 25 cc.	Fraction 3rd 25 cc.	Fraction 4th 15 cc.	Residue of 10 cc.	Residue of 25 cc.	Distillation Temperature of 90 cc. from 100.											Flash Point.	Number of Sample.	Remarks and Opinion of the Chief Analyst.
					Under 150°.	150°-154°.	155°-159°.	160°-164°.	165°-169°.	170°-174°.	175°-179°.	180°-184°.	185°-189°.	190°-194°.	195°-199°.	200°——.			
																	°		
1·4651	1·4671	1·4680	1·4775	.....	..	3	18	29	17	8	4	5	3	2	1	.	34·0	41941	Contains petroleum.
1·4659	1·46 .	1·4686	1·4818	.....	..	1	21	34	14	8	4	3	2	1	1	1	36·5	41942	" "
1·4704	1·4717	1·4738	1·4838	.....	..	..	5	48	31	6	..	..	..	..	..	..	38·5	41943	Wood turpentine.
1·4696	1·4703	.....	.....	1·4808	..	..	..	..	..	..	..	..	..	..	..	..	33·5	41944	Genuine.
1·4644	1·4663	1·4672	1·4793	.....	..	1	15	27	18	11	7	2	1	1	1	6	36·5	41945	Contains petroleum.
1·4690	1·4693	1·4707	1·4889	.....	0	5	78	7	..	..	..	..	..	..	..	..	32·5	38626	Genuine.
1·4627	1·4653	1·4683	1·4926	.....	3	7	23	14	18	6	5	1	4	1	.	9	33·	38627	Contains petroleum.
1·4691	1·4692	1·4703	1·1750	.....	..	2	80	8	..	..	..	..	..	..	..	..	34·5	38628	Doubtful.
1·4694	1·4700	1·4704	1·4820	.....	..	3	83	4	..	..	..	..	..	..	..	..	33·	38629	Genuine.
1·4698	1·4702	1·4719	1·5006	.....	..	3	67	16	3	1	..	..	..	..	..	..	31·5	38630	"
1·4676	1·4693	1·4713	1·4909	.....	2	17	58	3	..	..	..	..	..	..	..	..	29·	39640	Doubtful.
1·4697	1·4702	1·4714	1·4894	.....	..	1	78	11	..	..	..	..	..	..	..	..	33·5	39641	Genuine.
1·4677	1·4694	1.4713	1·4887	.....	3	17	61	9	..	..	..	..	..	..	..	..	27·	39642	Doubtful.
1·4676	1·4696	.....	.....	1·4790	..	..	..	..	..	..	..	..	..	..	..	..	28·	39643	"
1·4654	1·4666	1·4673	1·4788	.....	..	5	20	29	13	7	5	3	2	2	4	1	35	39644	Contains petroleum.
1·4695	1·4702	1·4715	1·4976	.....	..	5	70	12	3	..	..	..	..	..	..	..	32·5	36523	Doubtful.
1·4550	1·4636	1·4677	1·4800	....	32	23	32	3	..	..	..	..	..	..	..	..	12·	36524	Contains petroleum.
1·4650	1·4666	1·4673	1·4747	.....	..	3	36	30	15	5	1	..	..	..	..	..	33·	36525	" "
1·4698	1·4702	1·4720	1·4832	.....	..	2	88	..	..	..	..	..	..	..	..	..	32·5	36526	Genuine.
1·4516	1·4620	1·4676	1·4813	.....	41	21	25	3	..	..	..	..	..	..	..	..	9·	36527	Contains petroleum.
1·4603	1·4611	1·4608	1·5074	.....	..	2	23	34	11	9	5	1	2	3	..	..	37·	1256	" "
1·4790	1·4704	1·4718	1·4937	.....	..	2	69	18	1	..	..	..	..	..	..	..	34·	1257	Genuine.
1·4707	1·4689	1·4774	1·5166	.....	..	7	50	18	5	4	2	1	1	1	..	2	33·5	1258	Doubtful.
1·4644	1·4659	1·4679	1·4800	.....	..	3	12	26	18	12	3	4	3	1	0	.	37·	1259	Contains petroleum.
1·4640	1·4664	1·4682	1·4839	.....	..	4	17	17	16	13	10	5	1	1	1	15	36·	1260	" "
1·4694	1·4707	1·4767	1·5196	.....	..	10	38	27	6	5	1	1	1	..	1	..	35·	40442	Doubtful
1·4688	1·4702	1·4719	1·4974	..	..	5	68	14	3	..	..	..	..	..	..	..	33·5	40443	Genuine.
1·4690	1·4700	1·4710	1·4846	.....	..	10	73	7	..	..	..	..	..	..	..	..	31·5	40444	Doubtful.
1·4687	1·4696	.. ..	.....	1·4792	..	..	..	..	..	..	..	..	..	..	..	..	31·5	40445	Genuine.
1·4684	1·4686	1·4708	1·4779	.....	..	5	75	10	..	..	..	..	..	..	..	..	32·	40446	"
1·4702	1·4701	1·4717	1·4813	.....	1	8	81	..	..	..	..	..	..	..	..	..	35·5	42942	Doubtful.
1·4655	1·4664	1·4674	1·4866	.....	..	13	54	18	4	1	..	..	..	..	..	..	33·	42943	Contains petroleum.
1·4650	1·4671	1·4677	1·4790	.....	..	10	47	18	11	4	..	..	..	..	..	..	34·	42944	" "
1·4704	1·4710	1·4724	1·4789	.....	..	0	73	17	..	..	..	..	..	..	..	..	34·5	42945	Genuine.
1·4658	1·4662	1·4670	1·4760	.....	..	7	44	28	8	3	..	..	..	..	..	..	33·5	42946	Contains petroleum.
1·4692	1·4701	1·4712	1·4868	..	..	..	69	17	4	..	..	..	..	..	..	..	33·5	44201	Doubtful.
1·4696	1·4702	1·4721	1·4947	.....	..	4	71	13	2	..	..	..	..	..	..	..	31·5	44202	"
1·4612	1·4663	1·4676	1·4805	. . .	.	4	18	28	11	10	9	3	2	..	..	..	35·	44203	Contains petroleum.
1·4694	1·4700	1·4716	1·4963	.....	..	4	66	18	2	..	..	..	..	..	..	..	33·5	44205	Genuine.
1·4701	1·4708	1·4718	1·4808	.....	..	..	33	7	..	..	..	..	..	..	..	..	34·	44256	"
1·4690	1·4696	1·4708	1·4873	.....	..	4	83	3	..	..	..	..	..	..	..	..	32·5	41399	"
1·4694	1·4706	1·4718	1·4812	....	..	5	71	14	..	..	..	..	..	..	..	..	31·	41400	"
1·4703	1·4713	1·4726	1·4883	.....	..	..	77	13	..	..	..	..	..	..	..	..	34·5	41497	Doubtful.
1·4616	1·4646	1·4674	1·4894	.....	3	14	17	14	15	9	6	2	2	1	2	5	34·5	41498	Contains petroleum.
1·4690	1·4696	.....	.....	1·4750	..	..	..	..	..	..	..	..	..	..	..	..	33·5	41499	Genuine.
1·4702	1·4710	1·4723	1·4897	. . .	..	5	76	9	..	..	..	..	..	..	..	..	34·5	44731	Doubtful.
. . .	. . .	. . .	. . .	....	..	..	..	..	..	..	..	..	..	..	..	..	28·0	44733	"
1·4697	1·4702	1·4727	1·5053	.....	..	5	69	5	8	2	1	..	..	..	..	..	34·5	44736	Genuine.
1·4689	1·4693	1·4708	1·4836	.....	..	5	80	5	..	..	..	..	..	..	..	..	34·0	44745	"
. . .	. . .	. . .	. . .	.....	..	..	..	..	..	..	..	..	..	..	..	..	. . .	44748	Not worked.
1·4690	1·4702	1·4707	1·4813	.....	..	11	70	9	..	..	..	..	..	..	..	..	34·5	42501	Doubtful.
1·5688	1·4700	1·4713	1·4886	.....	..	6	80	4	..	..	..	..	..	..	..	..	32·5	42502	Genuine.
1·4690	1·4698	1·4710	1·4796	....	..	5	85	..	..	..	..	..	..	..	..	..	33·0	42503	"
1·4691	1·4698	1·4713	1·4878	.....	..	5	78	7	..	..	..	..	..	..	..	..	33·5	42504	"
1·4691	1·4700	....	.....	1·4740	..	..	..	..	..	..	..	..	..	..	..	..	33·5	42505	"

TABLE I, (PART II) BULL.

RESULTS OF

Name of Inspectoral District.	Number of Sample.	Hübl Iodine Number.	Insol. Residue from 10 cc. with 40 cc. H_2SO_4, 1 Conc. 1 fum.	Ref. Index 2nd of Insoluble Residue.	Ref. Index 20° of Turpentine.	Sp. gr. 15·5 of Turpentine.	Distillation Temp. 1st 25 cc. from 160 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Ref. Index 1st 25 cc. Distillate.
							° °	° °	° °	° °	
Manitoba	39871	380·8	1 15	1·4950	1·4696	·8681	152 – 157	157 – 157	157 – 158	158 – 163	1·4679
	39872	373·2	·95	1·4922	1·4699	·8697	152 – 155	155 – 156	156 – 157	157 – 162	1·4673
	39873	311·1	1·15	1·4900	1·4702	·8698	152 – 155	155 – 156	156 – 158	158 – 169	1·4676
	39874	359·6	·95	1·4959	1·5705	·8726	150 – 155	155 – 156	156 – 158	158 – 164	1·4667
	39875	361·7	·9	1·4927	1·4704	·8732	152 – 156	156 – 157	157 – 159	159 – 157	1·4676
Calgary	35637	380·9	·75	1·4954	1·4707	·8722	149 – 156	156 – 156	156 – 159	.....	1·4668
	35638	358·3	·95	1·4936	1·4702	·8662	148 – 155	155 – 157	157 – 158	158 – 168	1·4658
	35639	354·6	·85	1·4934	1·4703	·8720	152 – 157	157 – 158	158 – 160	160 – 167	1·4672
	35640	369·8	1·0	1·4918	1·4694	·8685	146 – 156	156 – 157	157 – 159	159 – 167	1·4676
	35641	367·4	·95	1·4945	1·4701	·8719	152 – 156	156 – 157	157 – 157	157 – 167	1·4667
Vancouver	37853	298·6	2·6	1·4650	1·4650	·8589	145 – 157	157 – 161	161 – 169	170 – 225	1·4584
	37851	368·1	·65	1·4990	1·4703	·8684	155 – 157	157 – 157	157 – 158	.....	1·4687
	37855	272·5	3·3	1·4596	1·4631	·8534	140 – 158	158 – 162	162 – 175	175 – 210	1·4570
	37856	345·1	·7	1·4984	1·4703	·8694	152 – 156	156 – 156	156 – 158	.....	1·4690
	37857	368·8	·75	1·4976	1·4702	·8679	152 – 155	155 – 156	156 – 157	.....	1·4674
Victoria	41671	367·1	·7	1·4804	1·4686	·8661	140 – 152	152 – 154	154 – 156	.....	1·4606
	41675	352·0	·95	1·4779	1·4682	·8653	140 – 155	155 – 158	158 – 159	.....	1·4610
	41676	299·0	2·85	1·4615	1·4645	·8548	140 – 157	157 – 161	161 – 172	172 – 215	1·4570
	41677	284·0	3·2	1·4620	1·4637	·8538	145 – 158	158 – 162	162 – 174	174 – 220	1·4572
	41678	369·6	·85	1·4944	1·4680	·8653	140 – 155	155 – 157	157 – 159	159 – 165	1·4602
	A	295·8	1·3	1·4913	1·4704	·8705	155 – 160	160 – 162	162 – 167	167 – 176	1·4677
	B	314·4	·7	1·4986	1·4678	·8681	.....	.....	.....	.....	.....
	C	317·1	·9	1·4948	1·4686	·8664	.....	.....	.....	.....	.....
	D	331·5	·9	1·4884	1·4678	·8670	.....	.....	.....	.....	.....
	E	349·1	·55	1·4971	1·4688	·8700	.....	.....	.....	.....	.....
	F	290·3	·6	1·4947	1·4750	·9065	.....	.....	.....	.....	.....
	G	247·8	·35	1·5013	1·4809	·9288	.....	.....	.....	.....	.....
	H	372·5	1·0	1·5003	1·4702	.....	155 – 157	157 – 157	157 – 158	158 – 158	1·4688
	I	238·0	4·15	1·4600	1·4631		148 – 159	159 – 165	165 – 180	180 – 215	1·4564
	K	211·4	4·0	1·4634	1·4651	·8562	151 – 161	161 – 164	165 – 177	177 – 206	1·4603

211—TURPENTINE.

ANALYSIS.

2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Residue 10 cc.	Residue 25 cc.	Distillation Temperature of 90 cc. from 100. Under 150°.	150°–154°.	155°–159°.	160°–164°.	165°–169°.	170°–174°.	175°–179°.	180°–184°.	185°–189°.	190°–194°.	195°–199°.	200°.	Flash Point.	Number of Sample.	Remarks, and opinion of the Chief Analyst.
																	°		
1·4689	1·4694	1·4709	1·4816	....	..	3	79	8	..	..	..	..	..	..	..	..	32·0	39871	Genuine.
1·4689	1·4699	1·4718	1·4830	.. ....	..	15	70	5	..	..	..	..	..	..	..	..	32·0	39872	"
1·4683	1·4692	1·4703	1·4870	....	.	5	72	10	3	..	..	..	..	..	..	..	33·0	39873	Doubtful.
1·4686	1·4698	1·4713	1·4913	.....	..	18	64	8	..	..	..	..	..	..	..	..	31·5	39874	"
1·4697	1·4703	1·4716	1·4933	....	..	7	74	7	1	..	..	..	..	..	..	..	31·0	39875	"
1·4690	1·4700	.....	.....	·4807	..	..	..	..	..	..	..	..	..	..	..	..	32·0	35637	Genuine.
1·4688	1·4700	1·4718	1·4970	.....	2	12	65	8	3	..	..	..	..	..	..	..	31·5	35638	Doubtful.
1·4698	1·4704	1·4713	1·4937	.....	.	7	59	23	2	..	..	..	..	..	..	..	32·0	35639	"
1·4687	1·4694	1·4705	1·4884	.....	3	4	71	10	2	..	..	..	..	..	..	..	34·0	35640	"
1·4692	1·4700	1·4718	1·4951	.. ..	..	7	75	7	2	..	..	..	..	..	..	..	32·5	35641	Genuine.
1·4654	1·4668	1·4666	1·4800	....	4	11	28	24	8	4	3	2	2	1	1	2	27·5	37853	Contains petroleum.
1·4696	1·4700	.....	.....	1·4750	..	..	..	..	..	..	..	..	..	..	..	..	34·0	37854	Genuine.
1·4643	1·4660	1·4675	1·4840	.....	6	6	22	22	13	5	4	3	2	..	1	3	21·5	37855	Contains petroleum.
1·4693	1·4710	.. ..	.....	1·4753	..	..	..	..	..	..	..	..	..	..	..	..	34·0	37856	Doubtful.
1·4686	1·4699	.....	....	1·4746	..	..	..	..	..	..	..	..	..	..	..	..	32·0	37857	Genuine.
1·4683	1·4698	.....	.....	1·4780	..	..	..	..	..	..	..	..	..	..	..	..	23·0	41674	Doubtful.
1·4677	1·4694	.....	.....	1·4769	..	..	..	..	..	..	..	..	..	..	..	..	24·0	41675	"
1·4648	1·4663	1·4662	1·4790	.....	5	10	25	24	8	7	2	2	2	1	1	3	25·0	41676	Contains petroleum.
1·4636	1·4663	1·4650	1·4740	....	4	9	21	23	12	9	3	2	2	2	1	2	26 0	41677	" "
1 4677	1·4696	1·4714	1·4930	....	6	16	53	15	..	..	..	..	..	..	..	..	23·5	41678	Doubtful.
1·4687	1·4706	1·4726	1 4873	.....	..	..	20	46	16	7	1	..	..	..	..	..	35·5	A	Wood turpentine.
.....	.....	...	.. .	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	B	" "
.....	....	.....	.. ..	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	C	" "
.....	.	..	.... .	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	D	" "
.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	E	" "
.....	.. ..	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	F	" "
.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	.....	G	" "
1·4697	1·4704	1·4713	1·4786	.....	..	..	90	..	..	..	..	..	..	..	..	..	.....	H	Genuine.
1·4624	1·4646	1·4663	1·4776	.....	2	9	17	22	16	6	3	5	3	1	1	5	30·5	I	Contains petroleum.
1 4640	1·4655	1·4668	1 4830	.....	..	4	19	21	16	10	10	4	2	1	1	2	35 0	K	" "

TABLE II.—TURPENTINE.

No. of Sample.	Iodine Number.	Residue from 10 cc. insoluble in H_2SO_4.	Refractive index of insoluble residue.	Refractive index of the Sample.	Specific gravity of the Sample.	Fractionation of 100 cc.				Refractive Indices of Fractions and Residues.						Volumes Obtained from 100 cc.										Flash Point.
						1st 25 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	1st 25 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Residue.	Res. 25 cc.	Below 150	to 154	to 159	to 164	to 169	to 174	to 179	to 184	to 189	to 194	to 199	Above 199	
						° '	° '	° '	° '																			
35637	389·9	0·75	1·4954	1·4707	0·8722	149 – 156	156 – 156	156 – 156	159	1·4668	1·4690	1·4700			1·4805	..	5	78	7	..	..	..	..	..	..	..	..	32 0
38626	372·3	0·75	1·4994	1·4703	0·8719	150 – 156	156 – 157	157 – 158	158 – 163	1·4680	1·4690	1·4693	1·4707	1·4889		..	3	83	4	..	..	..	..	..	..	..	..	32 5
38629	386·9	1·05	1·4996	1·4708	0·8684	152 – 156	156 – 157	157 – 158	158 – 161	1·4687	1·4694	1·4700	1·4704	1·4820		..	3	79	8	..	..	..	..	..	..	..	..	32 0
38629	386·9	1·05	1·4996	1·4708	0·8684	152 – 156	156 – 157	157 – 158	158 – 163	1·4679	1·4689	1·4694	1·4709	1·4816		..	3	79	8	..	..	..	..	..	..	..	..	32 0
39871	380·8	1·15	1·4950	1·4696	0·8681	152 – 157	157 – 157	157 – 158	158 – 163	1·4673	1·4689	1·4699	1·4718	1·4839		..	15	70	5	..	..	..	..	..	..	..	..	32 0
39872	373·2	0·95	1·4922	1·4689	0·8697	152 – 155	155 – 156	156 – 157	157 – 162	1·4681	1·4688	1·4702	1·4719	1·4974		..	5	68	14	3	..	..	..	..	..	..	..	32 5
40443	373·8	0·85	1·4997	1·4719	0·8735	152 – 156	156 – 156	156 – 160	160 – 167	1·4681	1·4690	1·4696	1·4708	1·4873		..	4	83	3	..	..	..	..	..	..	..	..	32 5
41399	382·2	1·00	1·4977	1·4701	0·8699	153 – 156	156 – 156	156 – 157	157 – 162	1·4679	1·4690	1·4696			1·4750	..												32 5
41499	395·0	0·95	1·5000	1·4703	0·8688	153 – 155	155 – 155	155 – 158	.....	1·4687	1·4690	1·4703			1·4808	..												32 5
41944	377·5	0·65	1·4967	1·4719	0·8746	153 – 157	157 – 158	158 – 159	.....	1·4692	1·4696	1·4703				..												32 5
42502	393·7	0·65	1·4994	1·4706	0·8699	153 – 155	155 – 156	156 – 157	157 – 162	1·4686	1·4688	1·4700	1·4713	1·4886		..	5	80	4	..	..	..	..	..	..	..	..	32 0
42503	392·6	0·70	1·4997	1·4700	0·8679	153 – 156	156 – 157	157 – 157	157 – 159	1·4687	1·4690	1·4698	1·4710	1·4796		..	5	85	..	..	..	..	..	..	..	..	..	32 5
42504	380·5	0·65	1·4993	1·4705	0·8702	152 – 155	155 – 156	156 – 158	158 – 162	1·4687	1·4691	1·4698	1·4713	1·4878		..	5	78	7	..	..	..	..	..	..	..	..	32 5
42504	380·5	0·65	1·4993	1·4705	0·8702	152 – 155	155 – 156	156 – 156	157	1·4688	1·4691	1·4700			1·4740	..												34 5
42505	375·6	0·60	1·4974	1·4700	0·8678	150 – 156	156 – 156	156 – 156	156 – 161	1·4692	1·4696	1·4703			1·4808	..												34 5
42945	376·8	0·60	1·4974	1·4700	0·8681	150 – 156	156 – 156	156 – 156	156 – 161	1·4702	1·4704	1·4710	1·4724	1·4789		..		73	17	..	..	..	..	..	..	..	..	33 5
44205	373·2	0·80	1·4984	1·4714	0·8748	150 – 157	157 – 158	158 – 160	160 – 168	1·4686	1·4694	1·4700	1·4716	1·4963		..	4	66	18	2	..	..	..	..	..	..	..	34 0
44745	375·1	0·60	1·4952	1·4716	0·8681	153 – 156	156 – 157	157 – 158	158 – 160	1·4678	1·4689	1·4693	1·4708	1·4836		..	5	80	5	..	..	..	..	..	..	..	..	34 5*
44736	363·9	0·75	1·5014	1·4718	0·8819	153 – 156	156 – 157	157 – 160	160 – 176	1·4686	1·4697	1·4702	1·4727	1·5053		..	5	69	8	5	2	1	..	..	..	..	..	32 5
35641	367·4	0·95	1·4945	1·4701	0·8719	152 – 1[illegible]	[illegible] – 157	157 – 157	157 – 167	1·4667	1·4692	1·4700	1·4718	1·4951		..	7	75	7	2	..	..	..	..	..	..	..	32 5
36526	365·8	1·05	1·5000	1·4706	0·8692	153 – 157	157 – 158	158 – 158	158 – 158	1·4686	1·4698	1·4702	1·4720	1·4832		..	2	88	..	..	..	..	..	..	..	..	..	32 5
37854	368·1	0·65	1·4990	1·4703	0·8684	155 – 157	157 – 157	157 – 158	.....	1·4687	1·4696	1·4700			1·4750	..												34 0
37857	368·8	0·75	1·4967	1·4702	0·8679	152 – 155	155 – 156	156 – 157	.....	1·4674	1·4686	1·4699			1·4746	..												34 5
38630	369·2	0·70	1·4991	1·4717	0·8759	154 – 157	157 – 158	158 – 161	161 – 171	1·4690	1·4698	1·4702	1·4719	1·5006		..	3	67	16	3	1	..	..	..	..	..	..	33 5
39641	368·9	0·90	1·5006	1·4710	0·8718	154 – 157	157 – 157	157 – 159	159 – 163	1·4690	1·4697	1·4702	1·4714	1·4894		..	1	78	11	..	..	..	..	..	..	..	..	31 5
40145	369·1	1·00	1·4903	1·4702	0·8707	150 – 156	156 – 158	158 – 159	.....	1·4667	1·4687	1·4696			1·4792	..												32 0
40446	368·9	1·30	1·4887	1·4687	0·8660	152 – 156	156 – 157	157 – 159	159 – 162	1·4667	1·4681	1·4686	1·4708	1·4779	.....	..	5	75	10	..	..	..	..	..	..	..	..	31 0
41400	365·3	1·10	1·4914	1·4697	0·8669	152 – 157	157 – 158	158 – 159	159 – 162	1·4664	1·4694	1·4706	1·4718	1·4812	.....	..	5	71	14	..	..	..	..	..	..	..	..	31 0
44256	369·5	1·00	1·5000	1·4710	0·8666	155 – 157	157 – 158	158 – 159	159 – 161	1·4698	1·4701	1·4708	1·4718	1·4808	.....	..	..	83	7	..	..	..	..	..	..	..	..	34 0
1257	365·0	0·75	1·4980	1·4714	0·8730	154 – 158	158 – 158	158 – 160	160 – 166	1·4689	1·4700	1·4704	1·4718	1·4937	.....	..	2	69	18	1	..	..	..	..	..	..	..	34 0
11	372·5	1·00	1·5003	1·4702	.....	155 – 157	157 – 157	157 – 158	158 – 158	1·4688	1·4697	1·4704	1·4713	1·4786	.....	..	..	80	..	..	..	..	..	..	..	..	..	

* Somewhat irregular.

TABLE III.

Designation of Sample.	Hubl Iodine Number.	Residue from 10 cc. insoluble in H_2SO_4.	Refractive index of insoluble reside.	Refraction index of the Sample.	Specific gravity of the Sample.	Fractionation of 100 cc. 1st 25 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Refractive Indices of Fractions and Residues. 1st 25 cc.	2nd 25 cc.	3rd 25 cc.	Next 15 cc.	Residue.	Res. 25 cc.	Volumes O… ised from 100 cc. Under 150°	150°-154°	155°-159°	160°-164°	165°-169°	170°-174°	175°-179°	180°-184°	185°-189°	190°-194°	195°-199°	200°-	Flash Point.
A	295·5	1·3	1·4943	1·4704	0·8705	155 – 160	160 – 162	162 – 167	167 176	1·4677	1·4687	1·4706	1·4726	1·4873				20	46	16	7	1						35·5
B	344·4	·7	1·4986	1·4678	0·8681																							
C	317·1	·9	1·4948	1·4696	0·8664																							
D	331·5	·9	1·4884	1·4678	0·8670																							
E	349·1	·55	1·4971	1·4688	0·8700																							
F	290·3	·6	1·4947	1·4750	0·9065																							
G	247·8	·35	1·5013	1·4800	0·9288																							
I	238·0	4·15	1·4600	1·4631	......	148 159	159 – 165	165 180	180 – 215	1·4564	1·4624	1·4646	1·4663	1·4776		2	9	17	22	16	6	3	5	3	1	1	5	30·5
K	211·4	4·0	1·4634	1·4651	0·8562	151 – 161	161 – 164	165 – 177	177 206	1·4603	1·4640	1·4655	1·4668	1·4830			4	19	21	16	10	19	4	2	1	1	2	35·