Horse oils and fats.	Color, etc.	Sp. gr. at 15° C.	Valenta. ° C.	Maumené. ° C.	Sp. temp. reaction.	Iodine No.	Iodine No. of clear oil.	Titer test. ° C.	Iodine No. of fatty acids.
1	White-brown semi fluid	0.919	80.2	46.0	95.8	75.1	....	32.5–33.5	72.9
2	Dark brown semi liquid	0.916	54.0	52.1	108.5	82.5	82.0	30.0–31.0	72.3
3	Yellow-brown liquid	0.922	71.0	54.7	114.0	86.3	83.7	25.0–26.0	78.7
		100° C.							
4	Golden brown nearly solid	0.798	48.0	54.2	112.9	79.9	81.8	30–31	80.4
5	Very like. 4	0.799	61.0	53.5	111.5	78.8	78.2	34–35	82.1

Neatsfoot oils: the samples are fairly concordant with the exception of No. 3; the gravity and Maumené test are higher than those of the others; as no adulterant could be proved, it is supposedly genuine.

Tallow oils: the results here, upon oils from different sources, are remarkably concordant.

Horse oils: as was expected from their different appearance, these show a considerable variation; the Valenta test is of no use whatsoever here; No. 5 came from a young horse; nothing is known about the others.

Were either of these oils used to adulterate neatsfoot, the horse oil would raise the Maumené and iodine values, and the titer test; tallow oil would lower the Maumené, and iodine values, and raise the titer test quite considerably.

A TEST FOR THE GUMMING QUALITY OF LUBRICATING OILS.

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SOME years ago in studying the Elaïdin test for oils, a few of the mineral lubricating oils were included, and it was noticed that those which deposited the most "tar" apparently changed the most in use. The test, other than a repetition with different oils, lacked confirmation as to its value except in one case. It was noticed that with a 25° paraffin oil the outside of the can containing it—where it was exposed to the air in thin layers—was covered with a skin closely resembling that produced

by linseed oil. The object of this work was to show that there is a connection between the amount of change ("tar") and the quantity of oxygen absorbed. The gumming test was applied after the manner of the Elaïdin test by treating 5 grams of the oil in a cordial glass with 11 grams of Roth's liquid (nitrosulphuric acid) the two being thoroughly stirred together and cooled by immersion in a pan of water at 10°–15° C. Brownish spots or, in case of a bad oil, masses form around the edges and become red in the course of two hours. The nitrosulphuric acid is prepared by saturating sulphuric acid of 46° Bé., containing a few drops of nitric acid, at 0° with nitric oxide.

The quantity of oxygen absorbed was determined by sealing 5 to 10 grams of the oil in a flask and heating it to 80°–105°, the flask being occasionally shaken. The oil was weighed into the flask, care being taken that none touched the neck; the neck was drawn down to a long thin-walled capillary, the flask allowed to cool at 20°, and then quickly sealed in a small blast-lamp flame. After heating about 100 hours the flask was allowed to cool to 20°, the capillary broken under water and the inflowing water weighed. This represented the number of cubic centimeters of oxygen absorbed from the air. The results are shown in the table. It was thought that possibly a difference between these oils might be shown by either the bromine, iodine or Maumené tests: the differences were, however, so slight as to show that these could not be used as a means of distinguishing between the oils.

The results should be compared crosswise of the table, as the temperatures, time of exposure, and amount of shaking varied with each test. With the engine oils the amount of tar formed seems to bear a close relation to the quantity of oxygen absorbed; this does not apparently hold true of the spindle oil tested.

	1.	2.	3.	4.
Name of oil	25° paraffin.	Red lubricating.	No 1 engine.	No. 1 spindle.
Appearance in gumming test	Dark brown pitchy cake.	Some dark pitch.	Dark brown, trace of pitch.	Medium brown, no pitch.
	cc.	cc.	cc.	cc.
Oxygen absorbed per 100 grams oil at 80°	45.6	60.0	12.2	36.0
	46.0	62.3	13.0	41.5
Oxygen absorbed at 80°–85°, 12 days	190.5	....	34.1	159.5
	180.0	....	....	160.9
	105.4	121.0	35.6	54.6
	101.6	....	36.4	50.4
Oxygen absorbed at 98°–115°, 12 days	....	427.0	111.0	321.0
	....	402.0	104.0	320.0
Oxygen absorbed at 95°–105°, 12 days	188.0	238.0	65.0	251.0
	170.0	272.0	....	....