OHIO PETROLEUM.

By J. A. Mandel and A. Bourgougnon.

This petroleum, produced at Lima, Ohio, is of a dark green color, very fluid, and marks 48° Baumé at 15° C. (Sp. Gr., 0.791). We did not observe that peculiar objectionable odor which the crude oil pumped from the oil fields of Ohio is said to possess. The refined products, naphtha and burning oil, had the same smell as that of the distillates obtained from Pennsylvania petroleum.

The refining of the naphtha was easily attained with sulphuric acid and washing.

The burning oil purified in the usual manner with sulphuric acid, caustic soda and washing, furnished a burning oil water while, without any fluorescence, better than standard.

The distillation in fifty parts, each part representing two per cent. by volume, gave the following results :

Per Cent.	Specific Gravity.	Per Cent.	Specific Gravity.	Per Cent.	Specific Gravity.	Per Cent.	Specific Gravity.	Per Cent.	Specific Gravity.
2	0.680	22	730	42	782	62	804	82	818
4	683	24	735	44	788	64	808	84	818
6	685	26	740	46	792	66	812	86	810
8	690	28	742	48	800	68	820	88	815
10	694	30	746	50	802	70	825	90	815
12	698	32	760	52	806	72	830	92	Residuum.
14	700	34	764	54	806	73	830	94	
16	706	36	768	56	806	76	810	96	
18	720	38	772	58	806	78	820	98	
20	728	40	778	60	800	80	820	100	

RETURNS.

16 per cent.	Naphtha, 70° Baumé.
68	"	Burning oil.
6	"	Paraffine oil.
10	"	Residuum.

The distillation started at 23° C. (we received this sample in the last part of October, 1890), this being due to the large amount of naphtha present, and when 60 per cent. were reached, at a temperature of 310° C., the hydrocarbons remaining in the retort were dissociated then gases escaped, lighter distillates were obtained, and as usual in such cases, the temperature decreased as indicated by the thermometer placed in the retort.

This decrease in the temperature was considerable, from 310° C. the thermometer went down gradually to 200° C. until 75 per cent. of oil were obtained, and from this point the temperature remained constant until the end of the distillation, therefore these hydrocarbons in *statu moriendi* absorbed much heat.

The areometer for liquids lighter than water, or a *"pese esprit"* of Baumé is universally adopted in all dealings with petroleum and its products for the determination of the weight of unity of volume.

One of us has given (*Proc. Am. Chem. Soc., Vol. 1, No. 5, p. 55*), formulæ for the conversion of areometric degrees into corresponding specific gravities for the hydromajor and hydrominor instruments of Baumé.

The calculated table for liquids heavier than water has been integrally reproduced (*Tucker Sugar Analysis, p. 109*).

For the modulus of the areometer for liquids lighter than water, several numbers have been proposed ; Dr. Tucker gives 146 against 144.329 as calculated and recorded in the communication above referred to. To calculate the constant number of an areometer it is necessary to know two specific gravities corresponding to two degrees of the scale, the number 144.329 was obtained by taking the 66th degree corresponding to 0.720 (*loc. cit.*)

Baumé has not given the specific gravities of the salt solutions he employed for the graduation of his instruments, and therefore these solutions are no longer employed.

The earliest specific gravity of the salt solution employed for the graduation of Baumé's hydrominor instrument that we could find is 1.073 (*Chevallier, Art de l' Ingénieur, etc., Paris, 1819*).

Adopting this specific gravity, and keeping the same notation as employed in the paper cited above, we have

$$\frac{V}{v} = \frac{1.073}{1} \text{ and } \frac{v+10}{v} = 1.073$$

whence

$$v = 136.9.$$

Gay-Lussac observed that the 30th degree of the areometer of Cartier corresponded to the 32d degree of Baumé; he also found that the 28th Cartier corresponded to the specific gravity 0.8791, therefore these two instruments can be employed to verify the correctness of their respective graduation.

$$1° \text{ Cartier} = \frac{32}{30} \text{ 1.066 Baumé}$$

$$28° \text{ C} \times 1.066 = 29.848 \text{ B}$$

$$\frac{144.329}{134.329 + 29.848} = 0.8791$$

and again,

Absolute alcohol at 15° C. has a specific gravity $= 0.795$ and mark 44° Cartier

$$44 \times 1.066 = 46.904 \text{ B.}$$

In the table we read 47° B $= 0.795$ specific gravity, a satisfactory result, since the numbers employed in these calculation have not a common measure.